WHAT IS CLAIMED IS:

1. A process for fabricating an optical fiber comprising the steps of:

a. preparing at least three spinning materials having different refractive indices, each of said spinning materials being made of at least one polymer and at least one dopant;

b. feeding said spinning materials to a concentric nozzle so that the refractive index decreases toward the outer periphery, and thereby extruding the spinning materials through said nozzle; and

c. allowing the dopant or dopants to diffuse between adjacent layers of the fiber within said nozzle, after extrusion from said nozzle or within said nozzle and after extrusion from said nozzle.

2. The process of claim 1 further comprising the step of drawing the fiber to a final diameter in the range of 0.5 mm to 2.0 mm.

3. The process of claim 1 wherein the spinning materials are fed to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, the spinning materials are extruded through said nozzle and the dopant or dopants are allowed to diffuse between adjacent layers of the fiber in the temperature range 150° C to 300° C.

4. The process of claim 1, wherein the spinning materials are fed to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and the spinning materials are extruded through said nozzle and the dopant or dopants are allowed to diffuse between adjacent layers of the fiber in the temperature range 210° C to 240° C.

5. The process of claim 1 wherein the dopant or dopants are allowed to diffuse within the nozzle.

6. The process of claim 1, wherein said polymer is formed from the polymerization of monomers or prepolymers of methacrylate, stryrene and their halogenated derivatives.

7. The process of claim 1, wherein said polymer is formed from the polymerization of monomers or prepolymers selected from the group consisting of: methyl methacrylate; glycidyl methacrylate; benzyl methacrylate; phenyl methacrylate; vinyl benzoate; styrene; p-fluorostyrene; 2-chloroethyl methacrylate; isobornyl methacrylate; adamantyl methacrylate; tricylodecyl methacrylate; 1-methylcyclohexyl methacrylate; 2-chlorocyclohexyl methacrylate; glycidyl methacrylate; methyl α-chloroacrylate; 2,2,2-trifluoroethyl methacrylate; 2,2,3,3-tetrafluoropropyl methacrylate; 2,2,3,3,3-pentafluoropropyl methacrylate; 2,2,2,-trifluoro-1-trifluoromethylethyl methacrylate; 1,3-dichloropropyl methacrylate; 2-chloro-1-chloromethylethyl methacrylate; 1-phenylethyl methacrylate; 2-phenylethyl methacrylate; diphenylmethyl methacrylate; 1,2-diphenylethyl methacrylate; 1-bromoethyl methacrylate; benzyl acrylate; α, α-dimethylbenzyl methacrylate; bornyl methacrylate; cyclohexyl methacrylate; tetrahydrofurfyl methacrylate; allyl methacrylate; tetrahydrofurfuryl methacrylate; vinyl chloroacetate; 2,2,3,4,4,4-hexafluorobutyl methacrylate; 2,2,3,3,4,4,5,5-octafluoropentyl methacrylate; 2,2,2-trifluoroethyl α-fluoroacrylate; 2,2,3,3-tetrafluoropropyl α-fluoroacrylate; 2,2,3,3,3-pentafluoropropyl α-fluoroacrylate; 2,2,3,3,4,4,5,5-octafluoropentyl α-fluoroacrylate; o- or p-difluorostyrene; vinyl acetate; tert-butyl methacrylate; isopropyl methacrylate; hexadecyl methacrylate; isobutyl methacrylate; α-trifluoromethacrylates, β-fluoroacrylates, β,β-difluoroacrylates, β-trifluoromethacrylates, β,β-bis(trifluoromethyl) acrylates and α-chloroacrylates.

8. The process of claim 1, wherein said dopant or dopants are organic molecules of less than 20 carbons, and alkyl metal oxide or a rare earth alkyl oxide.

9. The process of claim 8, wherein said one or more dopants comprise approximately 0-30% by weight of each said layer.

10. A process for fabricating an optical fiber comprising the steps of:

a. preparing at least three spinning materials having different refractive indices, each of said spinning materials being made of at least one homopolymer and at least one dopant;

b. feeding said spinning materials to a concentric nozzle so that the refractive index decreases toward the outer periphery, and extruding the spinning materials through said nozzle; and

c. allowing the dopant or dopants to diffuse between adjacent layers of the fiber within said nozzle, after extrusion from said nozzle or within said nozzle and after extrusion from said nozzle;

11. The process of claim 10 further comprising the step of drawing the fiber to a final diameter in the range of 0.5 mm to 2.0 mm.

12. The process of claim 10 wherein the spinning materials are fed to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and the spinning materials are extruded through said nozzle and the dopant or dopants are allowed to diffuse between adjacent layers of the fiber in the temperature range 150° C to 300° C.

13. The process of claim 10, wherein the spinning materials are fed to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and the spinning materials are extruded through said nozzle and the dopant or dopants are allowed to diffuse between adjacent layers of the fiber in the temperature range 210° C to 240° C.

14. The process of claim 10, wherein the dopant or dopants are allowed to diffuse within the nozzle.

15. The process of claim 10, wherein said homopolymer is formed from the polymerization of monomers or prepolymers of methacrylate, stryrene and their halogenated derivatives.

16. The process of claim 10, wherein said homopolymer is formed from the polymerization of monomers or prepolymers selected from the group consisting of: methyl methacrylate; glycidyl methacrylate; benzyl methacrylate; phenyl methacrylate; vinyl benzoate; styrene; p-fluorostyrene; 2-chloroethyl methacrylate; isobornyl methacrylate; adamantyl methacrylate; tricylodecyl methacrylate; 1-methylcyclohexyl methacrylate; 2-chlorocyclohexyl methacrylate; glycidyl methacrylate; methyl α-chloroacrylate; 2,2,2-trifluoroethyl methacrylate; 2,2,3,3-tetrafluoropropyl methacrylate; 2,2,3,3,3-pentafluoropropyl methacrylate; 2,2,2,-trifluoro-1-trifluoromethylethyl methacrylate; 1,3-dichloropropyl methacrylate; 2-chloro-1-chloromethylethyl methacrylate; 1-phenylethyl methacrylate; 2-phenylethyl methacrylate; diphenylmethyl methacrylate; 1,2-diphenylethyl methacrylate; 1-bromoethyl methacrylate; benzyl acrylate; α, α-dimethylbenzyl methacrylate; bornyl methacrylate; cyclohexyl methacrylate; tetrahydrofurfyl methacrylate; allyl methacrylate; tetrahydrofurfuryl methacrylate; vinyl chloroacetate; 2,2,3,4,4,4-hexafluorobutyl methacrylate; 2,2,3,3,4,4,5,5-octafluoropentyl methacrylate; 2,2,2-trifluoroethyl α-fluoroacrylate; 2,2,3,3-tetrafluoropropyl α-fluoroacrylate; 2,2,3,3,3-pentafluoropropyl α-fluoroacrylate; 2,2,3,3,4,4,5,5-octafluoropentyl α-fluoroacrylate; o- or p-difluorostyrene; vinyl acetate; tert-butyl methacrylate; isopropyl methacrylate; hexadecyl methacrylate; isobutyl methacrylate;

α-trifluoromethacrylates, β-fluoroacrylates, β,β-difluoroacrylates, β-trifluoromethacrylates, β,β-bis(trifluoromethyl) acrylates and α-chloroacrylates.

17. The process of claim 10, wherein said one or more dopants are selected from the group consisting of: diphenyl phthalate, phenyl benzoate, benzylbutylphthalate, benzyl benzoate, diphenyl sulfide, 3-phenyl-1-propanol, benzyl methacrylate, halogenated cyclic or acyclic compounds with less than 20 carbons, such as bromobenzene, 1,4 dibromobenzene, bromonapthalene, 1, 2, 4-trichloro benzene, o-dichlorobenzene, m-dichlorobenzene, 1,2-dibromethane, phthalic acids, benzoic acids, naphthalenes, cyclic ethers such as dibenzyl ether, phenoxy toluene, diphenyl ether, bicyclic compounds such as biphenyl, diphenyl sulfide, diphenyl methane 1-methoxyphenyl-1-phenylethane, alkyl metal oxides and rare earth alkyl oxides.

18. The process of claim 17, wherein said one or more dopants comprise approximately 0-30% by weight of each said layer.

19. The process of claim 10, wherein the optical fiber further comprising a protective layer.

20. The process of claim 19, wherein said protective layer comprises a polymer selected from the group consisting of: Teflon PFA, Teflon AF , and Teflon FEP.

21. The process of claim 10, wherein said each spinning material consists of the same homopolymer.

22. The process of claim 21, wherein said homopolymer is formed from the polymerization of monomers or prepolymers of methacrylate, stryrene and their halogenated derivatives.

23. The process of claim 21, wherein said homopolymer is formed from the polymerization of monomers or prepolymers selected from the group consisting of: methyl methacrylate; glycidyl methacrylate; benzyl methacrylate; phenyl methacrylate; vinyl benzoate; styrene; p-fluorostyrene; 2-chloroethyl methacrylate; isobornyl methacrylate; adamantyl methacrylate; tricylodecyl methacrylate; 1-methylcyclohexyl methacrylate; 2-chlorocyclohexyl methacrylate; glycidyl methacrylate; methyl α-chloroacrylate; 2,2,2-trifluoroethyl methacrylate; 2,2,3,3-tetrafluoropropyl methacrylate; 2,2,3,3,3-pentafluoropropyl methacrylate; 2,2,2,-trifluoro-1-trifluoromethylethyl methacrylate; 1,3-dichloropropyl methacrylate; 2-chloro-1-chloromethylethyl methacrylate; 1-phenylethyl methacrylate; 2-phenylethyl methacrylate; diphenylmethyl methacrylate; 1,2-diphenylethyl methacrylate; 1-bromoethyl methacrylate; benzyl acrylate; α, α-dimethylbenzyl methacrylate; bornyl methacrylate; cyclohexyl methacrylate; tetrahydrofurfyl methacrylate; allyl methacrylate; tetrahydrofurfuryl methacrylate; vinyl chloroacetate; 2,2,3,4,4,4-hexafluorobutyl methacrylate; 2,2,3,3,4,4,5,5-octafluoropentyl methacrylate; 2,2,2-trifluoroethyl α-fluoroacrylate; 2,2,3,3-tetrafluoropropyl α-fluoroacrylate; 2,2,3,3,3-pentafluoropropyl α-fluoroacrylate; 2,2,3,3,4,4,5,5-octafluoropentyl α-fluoroacrylate; o- or p-difluorostyrene; vinyl acetate; tert-butyl methacrylate; isopropyl methacrylate; hexadecyl methacrylate; isobutyl methacrylate; α-trifluoromethacrylates, β-fluoroacrylates, β,β-difluoroacrylates, β-trifluoromethacrylates, β,β-bis(trifluoromethyl) acrylates and α-chloroacrylates.

24. The process of claim 21, wherein said one or more dopants are selected from the group consisting of: diphenyl phthalate, phenyl benzoate, benzylbutylphthalate, benzyl benzoate, diphenyl sulfide, 3-phenyl-1-propanol, benzyl methacrylate, halogenated cyclic or acyclic compounds with less than 20 carbons, such as bromobenzene, 1,4 dibromobenzene,

bromonapthalene, 1, 2, 4-trichloro benzene, o-dichlorobenzene, m-dichlorobenzene, 1,2-dibromethane, phthalic acids, benzoic acids, naphthalenes, cyclic ethers such as dibenzyl ether, phenoxy toluene, diphenyl ether, bicyclic compounds such as biphenyl, diphenyl sulfide, diphenyl methane 1-methoxyphenyl-1-phenylethane, alkyl metal oxides and rare earth alkyl oxides.

25. The process of claim 24, wherein said one or more dopants comprise approximately 0-30% by weight of each said layer.

26. The process of claim 21, wherein the optical fiber further comprising a protective layer.

27. The process of claim 26, wherein said protective layer comprises a copolymer of approximately 65-95% by weight vinylidene fluouride and approximately 5-35% by weight of tetrafluoroethylene.

28. A process for fabricating an optical fiber comprising the steps of:

a. preparing at least five spinning materials having different refractive indices, each of said spinning materials being made of the same homopolymer and the dopant bromobenzene;

b. feeding said spinning materials to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and thereby extruding the spinning materials through said nozzle; and

c. allowing the dopant to diffuse between adjacent layers of the fiber within said nozzle, after extrusion from said nozzle or within said nozzle and after extrusion from said nozzle;

29. The process of claim 28 further comprising the step of drawing the fiber to a final diameter in the range of 0.5 mm to 2.0 mm.

30. The process of claim 28, wherein the spinning materials are fed to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and the spinning materials are extruded through said nozzle and the dopant or dopants are allowed to diffuse between adjacent layers of the fiber in the temperature range 150° C to 300° C.

31. The process of claim 28, wherein the spinning materials are fed to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and the spinning materials are extruded through said nozzle and the dopant or dopants are allowed to diffuse between adjacent layers of the fiber in the temperature range 210° C to 240° C.

32. The process of claim 28, wherein the dopant bromobenzene is allowed to diffuse within the nozzle.

33. The process of claim 28, wherein the first layer has a thickness of approximately 0.25mm, the second, third and fourth layers each have a thickness of approximately 0.075mm and the fifth layer has a thickness of approximately 0.15mm.

34. The process of claim 28, wherein said homopolymer is formed from the polymerization of monomers or prepolymers of methacrylate, stryrene and their halogenated derivatives.

35. The process of claim 28, wherein said homopolymer is formed from the polymerization of monomers or prepolymers selected from the group consisting of: methyl methacrylate; glycidyl methacrylate; benzyl methacrylate; phenyl methacrylate; vinyl benzoate; styrene; p-fluorostyrene; 2-chloroethyl methacrylate; isobornyl methacrylate; adamantyl methacrylate; tricylodecyl methacrylate; 1-methylcyclohexyl methacrylate; 2-chlorocyclohexyl

methacrylate; glycidyl methacrylate; methyl α-chloroacrylate; 2,2,2-trifluoroethyl methacrylate; 2,2,3,3-tetrafluoropropyl methacrylate; 2,2,3,3,3-pentafluoropropyl methacrylate; 2,2,2,-trifluoro-1-trifluoromethylethyl methacrylate; 1,3-dichloropropyl methacrylate; 2-chloro-1-chloromethylethyl methacrylate; 1-phenylethyl methacrylate; 2-phenylethyl methacrylate; diphenylmethyl methacrylate; 1,2-diphenylethyl methacrylate; 1-bromoethyl methacrylate; benzyl acrylate; α, α-dimethylbenzyl methacrylate; bornyl methacrylate; cyclohexyl methacrylate; tetrahydrofurfyl methacrylate; allyl methacrylate; tetrahydrofurfuryl methacrylate; vinyl chloroacetate; 2,2,3,4,4,4-hexafluorobutyl methacrylate; 2,2,3,3,4,4,5,5-octafluoropentyl methacrylate; 2,2,2-trifluoroethyl α-fluoroacrylate; 2,2,3,3-tetrafluoropropyl α-fluoroacrylate; 2,2,3,3,3-pentafluoropropyl α-fluoroacrylate; 2,2,3,3,4,4,5,5-octafluoropentyl α-fluoroacrylate; o- or p-difluorostyrene; vinyl acetate; tert-butyl methacrylate; isopropyl methacrylate; hexadecyl methacrylate; isobutyl methacrylate; α-trifluoromethacrylates, β-fluoroacrylates, β,β-difluoroacrylates, β-trifluoromethacrylates, β,β-bis(trifluoromethyl) acrylates and α-chloroacrylates.

36. The process of claim 35, wherein said dopant comprises approximately 0-30% by weight of each said layer.

37. The process of claim 28, wherein said optical fiber further comprising a protective layer.

38. The process of claim 37, wherein said protective layer comprises a copolymer of approximately 65-95% by weight vinylidene fluouride and approximately 5-35% by weight of tetrafluoroethylene.

39. A process for fabricating an optical fiber comprising the steps of:

a. preparing at least five spinning materials having different refractive indices, each of said spinning materials being made of the polymer PMMA and the dopant bromobenzene;

b. feeding said spinning materials to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and thereby extruding the spinning materials through said nozzle; and

c. allowing the dopant to diffuse between adjacent layers of the fiber within said nozzle, after extrusion from said nozzle or within said nozzle and after extrusion from said nozzle;

40. The process of claim 39 further comprising the step of drawing the fiber to a final diameter in the range of 0.5 mm to 2.0 mm.

41. The process of claim 39, wherein the spinning materials are fed to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and the spinning materials are extruded through said nozzle and the dopant or dopants are allowed to diffuse between adjacent layers of the fiber in the temperature range 150° C to 300° C.

42. The process of claim 39, wherein the spinning materials are fed to a multi-layer concentric nozzle so that the refractive index decreases toward the outer periphery, and the spinning materials are extruded through said nozzle and the dopant or dopants are allowed to diffuse between adjacent layers of the fiber in the temperature range 210° C to 240° C.

43. The process of claim 39, wherein the dopant is allowed to diffuse within the nozzle.

44. The process of claim 39, wherein the first layer has a thickness of approximately 0.25mm, the second, third and fourth layers each have a thickness of approximately 0.075mm and the fifth layer has a thickness of approximately 0.15mm.

45. The process of claim 39, wherein said dopant bromobenzene comprises approximately 0-30% by weight of each said layer.

46. The process of claim 39, further comprising a protective layer.

47. The process of claim 46, wherein said protective layer comprises a copolymer of approximately 65-95% by weight vinylidene fluouride and approximately 5-35% by weight of tetrafluoroethylene.

48. The process of Example 1.

49. The process of Example 2.

50. The process of Example 3.